

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
24 December 2003 (24.12.2003)

PCT

(10) International Publication Number  
WO 2003/106993 A3

(51) International Patent Classification<sup>7</sup>: G01N 29/10,  
G01B 17/00

(21) International Application Number:  
PCT/US2003/019133

(22) International Filing Date: 17 June 2003 (17.06.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
60/389,394 17 June 2002 (17.06.2002) US

(71) Applicant (for all designated States except US):  
SWAGELOK COMPANY [US/US]; 2950 Solon Road,  
Solon, OH 44139 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): ALES, Richard, A.  
[US/US]; 6455 Southgrove Road, Mentor, OH 44060 (US).  
GLIME, William, H. [US/US]; 1296 Bowdin, Painesville,  
OH 44077 (US). HULL, John, Barry [GB/GB]; Lea Cot-  
tage, Melton Road, Hichkling Pastures, Melton Mowbray,

Leicestershire LE14 2QG (GB). RUBINSKI, Jeffrey, M.  
[US/US]; 2214 Buena Vista Drive, Wickliffe, OH 44092  
(US). SEYMOUR, Michael, Douglas [GB/GB]; Pear Tree  
Lodge, 2A Scrimshire Lane, Cotgrave, Nottinghamshire  
NG12 3JD (GB). WILLIAMS, Peter, C. [US/US]; 3495  
Edison Road, Cleveland Heights, OH 44121 (US). YANG,  
Wenxian [GB/GB]; 59A Montpelier Road, Dunkirk, Not-  
tinghamshire NG7 2JY (GB).

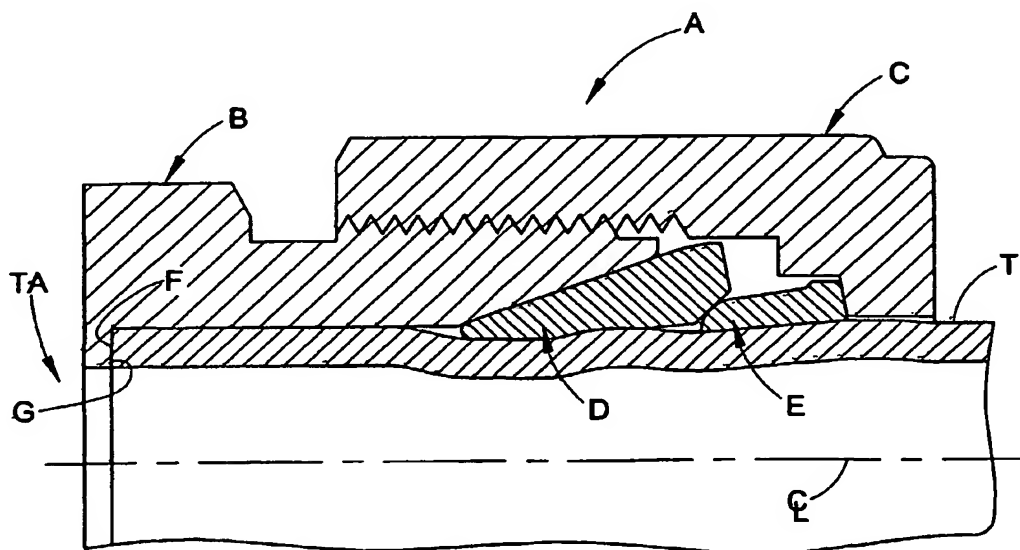
(74) Agent: MCKNIGHT, Douglas, B.; Calfee, Halter & Gris-  
wold LLP, 800 Superior Avenue, Cleveland, OH 44114  
(US).

(81) Designated States (national): AE, AG, AL, AM, AT, AU,  
AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU,  
CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH,  
GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC,  
LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW,  
MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE,  
SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ,  
VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (regional): ARIPO patent (GH, GM,  
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),  
Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),

[Continued on next page]

(54) Title: ULTRASONIC TESTING OF FITTING ASSEMBLY FOR FLUID CONDUITS WITH A HAND-HELD APPARATUS



(57) Abstract: Hand-held apparatus and method for determining relative and/or absolute axial position of a conduit end within a fluid coupling includes application of input ultrasonic energy in the form of transient shear waves and analyzing the reflected energy. Application of the input energy collected at different radial positions about a first axial location is used with wavelet based correlation techniques to better analyze the reflected energy signals. Quality of the abutment between the conduit end and a surface associated with the coupling may also be determined as a separate or combined feature of the axial position determination.